

Atomic-Width Insulators to Permit Safe Lithium Voltage Cell Overcharge

Sometime in 2020

Simon Edwards

Research Acceleration Initiative

Introduction

The overcharge of lithium batteries leads to fire, making the batteries potentially unsafe.

Abstract

In order to both improve the safety of such batteries and to increase their capacity, atomic thicknesses of graphene or hexaboron nitride (hBn) may be used in order to insulate individual voltage cells from one another in order to prevent arcing between cells. The deposition of large quantities of two-dimensional thin film materials upon irregularly-shaped objects such as voltage cells is challenging both because large, coherent sections of the materials are difficult to produce and their brittleness makes them difficult to move or manipulate. The key to achieving this is the controlled electrification of these semi-metals in order to control the adhesion pattern of sheets as they are produced and to increase the cohesiveness of the sheets during manipulation.

Conclusion

As these insulators are exceptionally effective, they would render such cascade events essentially impossible, perhaps allowing for a overcharge of up to 120% in relative terms.